

WHAT IS CLAIMED IS:

1. An organic light emitting device, comprising:  
 an anode;  
 a cathode; and  
 a light emission region that emits light disposed between the anode and  
 cathode, the light emission region including an organic light emitting material;  
 wherein the organic light emitting device is in an annealed condition.
2. The organic light emitting device of claim 1, wherein the organic light  
 emitting device is formed by annealing an organic light emitting device at a  
 temperature and for a period of time effective to (i) decrease an operating voltage of  
 the organic light emitting device, and (ii) increase an energy conversion efficiency of  
 the organic light emitting device.
3. The organic light emitting device of claim 1, wherein the organic light  
 emitting device is annealed at a temperature and for a period of time effective to (i)  
 decrease the operating voltage of the organic light emitting device by at least about  
 10%, and (ii) increase the energy conversion efficiency of the organic light emitting  
 device by at least about 10%.
4. The organic light emitting device of claim 1, wherein the light  
 emission region comprises:  
 a hole transport region, adjacent to the anode, comprised of a hole  
 transport material; and  
 an electron transport region, adjacent to the cathode, comprised of an  
 electron transport material;  
 wherein at least one of the hole transport region and the electron  
 transport region emits light.
5. The organic light emitting device of claim 1, wherein the light  
 emission region comprises:  
 a hole transport region, adjacent to the anode, comprised of a hole  
 transport material;  
 an electron transport region, adjacent to the cathode, comprised of an  
 electron transport material; and  
 a light emitting portion, interposed between the hole transport region  
 and the electron transport region, comprised of an organic light emitting material.

6. The organic light emitting device of claim 1, wherein the light emission region comprises a mixed region including a mixture of a hole transport material and an electron transport material.

7. The organic light emitting device of claim 1, wherein the light emission region comprises:

a mixed region including a mixture of a hole transport material and an electron transport material; and

at least one of (i) a hole transport region between the anode and the mixed region; and (ii) an electron transport region between the cathode and the mixed region;

wherein at least one of the hole transport region, the electron transport region and the mixed region emits light.

8. The organic light emitting device of claim 7, wherein the light emission region comprises a material selected from the group consisting of polyphenylenes, polyphenylvinylenes, polyfluorenes, polypyrroles, polyanilines and derivatives thereof.

9. The organic light emitting device of claim 6, wherein the light emission region comprises a material selected from the group consisting of polyphenylenes, polyphenylvinylenes, polyfluorenes, polypyrroles, polyanilines and derivatives thereof.

10. The organic light emitting device of claim 5, wherein the light emission region comprises a material selected from the group consisting of polyphenylenes, polyphenylvinylenes, polyfluorenes, polypyrroles, polyanilines and derivatives thereof.

11. The organic light emitting device of claim 4, wherein the light emission region comprises a material selected from the group consisting of polyphenylenes, polyphenylvinylenes, polyfluorenes, polypyrroles, polyanilines and derivatives thereof.

12. The organic light emitting device of claim 1, wherein the light emission region comprises a material selected from the group consisting of polyphenylenes, polyphenylvinylenes, polyfluorenes, polypyrroles, polyanilines and derivatives thereof.

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13. The organic light emitting device of claim 7, wherein the light emission region comprises a material selected from the group consisting of metal oxinoids, aromatic tertiary amines, indolocarbazoles, triazines, stilbenes, anthracenes, oxadiazole metal chelates, porphyrins, and derivatives thereof.

5 14. The organic light emitting device of claim 6, wherein the light emission region comprises a material selected from the group consisting of metal oxinoids, aromatic tertiary amines, indolocarbazoles, triazines, stilbenes, anthracenes, oxadiazole metal chelates, porphyrins, and derivatives thereof.

10 15. The organic light emitting device of claim 5, wherein the light emission region comprises a material selected from the group consisting of metal oxinoids, aromatic tertiary amines, indolocarbazoles, triazines, stilbenes, anthracenes, oxadiazole metal chelates, porphyrins, and derivatives thereof.

15 16. The organic light emitting device of claim 4, wherein the light emission region comprises a material selected from the group consisting of metal oxinoids, aromatic tertiary amines, indolocarbazoles, triazines, stilbenes, anthracenes, oxadiazole metal chelates, porphyrins, and derivatives thereof.

20 17. The organic light emitting device of claim 1, wherein the light emission region comprises a material selected from the group consisting of metal oxinoids, aromatic tertiary amines, indolocarbazoles, triazines, stilbenes, anthracenes, oxadiazole metal chelates, porphyrins, and derivatives thereof.

25 18. The organic light emitting device of claim 7, wherein the hole transport material is selected from the group consisting of aromatic tertiary amines and indolocarbazole compounds, and the electron transport material is selected from the group consisting of metal oxinoids, triazines, stilbenes, oxadiazole metal chelates and derivatives thereof.

30 19. The organic light emitting device of claim 6, wherein the hole transport material is selected from the group consisting of aromatic tertiary amines and indolocarbazole compounds, and the electron transport material is selected from the group consisting of metal oxinoids, triazines, stilbenes, oxadiazole metal chelates and derivatives thereof.

20. The organic light emitting device of claim 5, wherein the hole transport material is selected from the group consisting of aromatic tertiary amines and indolocarbazole compounds, and the electron transport material is selected from the

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group consisting of metal oxinoids, triazines, stilbenes, oxadiazole metal chelates and derivatives thereof.

21. The organic light emitting device of claim 4, wherein the hole transport material is selected from the group consisting of aromatic tertiary amines and indolocarbazole compounds, and the electron transport material is selected from the group consisting of metal oxinoids, triazines, stilbenes, oxadiazole metal chelates and derivatives thereof.

22. The organic light emitting device of claim 7, wherein the hole transport material is a naphthyl-substituted benzidine derivative or indolocarbazole compound, and the electron transport material is tris (8-hydroxyquinoline) aluminum or bis(8-hydroxyquinolato)-(4-phenylphenolato)aluminum.

23. The organic light emitting device of claim 6, wherein the hole transport material is a naphthyl-substituted benzidine derivative or indolocarbazole compound, and the electron transport material is tris (8-hydroxyquinoline) aluminum or bis(8-hydroxyquinolato)-(4-phenylphenolato)aluminum.

24. The organic light emitting device of claim 5, wherein the hole transport material is a naphthyl-substituted benzidine derivative or indolocarbazole compound, and the electron transport material is tris (8-hydroxyquinoline) aluminum or bis(8-hydroxyquinolato)-(4-phenylphenolato)aluminum.

25. The organic light emitting device of claim 4, wherein the hole transport material is a naphthyl-substituted benzidine derivative or indolocarbazole compound, and the electron transport material is tris (8-hydroxyquinoline) aluminum or bis(8-hydroxyquinolato)-(4-phenylphenolato)aluminum.

26. The organic light emitting device of claim 1, wherein the device emits light having a wavelength of from about 400 nm to about 700 nm.

27. The organic light emitting device of claim 1, wherein the device operates under AC or DC driving conditions.

28. A display comprising at least one organic light emitting device according to claim 1.

29. A method of treating an organic light emitting device, comprising:  
providing an as-fabricated organic light emitting device, comprising:  
an anode;  
a cathode; and

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a light emission region that emits light between the anode and cathode, the light emission region including an organic light emitting material; and

annealing the as-fabricated organic light emitting device at an annealing temperature and for an annealing period effective to (i) decrease an operating voltage of the as-fabricated organic light emitting device, and (ii) increase an energy conversion efficiency of the as-fabricated organic light emitting device.

30. The method of claim 29, wherein the annealing of the as-fabricated organic light emitting device (i) decreases the operating voltage of the as-fabricated organic light emitting device by at least about 10%, and (ii) increases the energy conversion efficiency of the as-fabricated organic light emitting device by at least about 10%.

31. The method of claim 29, wherein the annealing temperature is below the melting temperature of a material having the lowest melting temperature of the entire organic light emitting device.

32. The method of claim 29, wherein the annealing temperature is below the glass transition temperature of a material having the lowest glass transition temperature of the entire organic light emitting device.

33. The method of claim 29, wherein the annealing temperature is from about 50°C to about 150°C.

34. The method of claim 33, wherein the annealing period is from about 0.1 hrs. to about 100 hrs.

35. The method of claim 29, wherein the light emission region comprises a mixture of a hole transport material and an electron transport material.

36. The method of claim 29, wherein the light emission region comprises:  
a mixed region including a mixture of a hole transport material and an electron transport material; and

at least one of (i) a hole transport region between the anode and the mixed region, and (ii) an electron transport region between the cathode and the mixed region;

wherein at least one of the hole transport region, the electron transport region and the mixed region emits light.

37. The method of claim 36, wherein the hole transport material comprises a tertiary aromatic amine or an indolocarbazole compound, and the electron transport

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material comprises a metal oxinoid compound, a triazine compound, or a stilbene derivative.

38. The method of claim 29, wherein the organic light emitting device emits light having a wavelength in the range of from about 400 nm to about 700 nm.

5 39. The method of claim 29, wherein the annealing comprises:  
heating the as-fabricated organic light emitting device up to the annealing temperature at a heating rate; and

cooling the as-fabricated organic light emitting device from the annealing temperature to a lower temperature at a cooling rate,  
10 wherein the heating rate and the cooling rate are each from about 0.5°C/min to about 20°C/min.

40. The method of claim 39, wherein the heating rate and the cooling rate are each from about 1°C/min to about 5°C/min.

41. A method of treating organic light emitting devices, comprising:  
15 placing a first as-fabricated organic light emitting device in an annealing chamber;

placing a second as-fabricated organic light emitting device in an annealing chamber;

20 wherein the first and second as-fabricated organic light emitting devices each comprise:

an anode;

a cathode; and

a light emission region that comprises an organic light emitting material disposed between the anode and the cathode; and

25 annealing the first and second as-fabricated organic light emitting devices at an annealing temperature and for an annealing period effective to (i) decrease the operating voltage of each of the first and second as-fabricated organic light emitting devices, and (ii) increase an energy conversion efficiency of each of the first and second as-fabricated organic light emitting devices;

30 wherein the annealed first and second as-fabricated organic light emitting devices have respective energy conversion efficiencies that differ by less than about 15%.

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42. The method of claim 41, wherein the first and second as-fabricated organic light emitting devices are annealed together in the same annealing chamber.

43. The method of claim 41, wherein the first and second as-fabricated organic light emitting devices are annealed separately in one of the same annealing chamber and a different annealing chamber.

44. The method of claim 41, wherein the annealing temperature is below the melting temperature of a material having the lowest melting temperature of the entire organic light emitting device.

45. The method of claim 41, wherein the annealing temperature is below the glass transition temperature of a material having the lowest glass transition temperature of the entire organic light emitting device.

46. The method of claim 41, wherein the annealing temperature is from about 50°C to about 150°C.

47. The method of claim 46, wherein the annealing period is from about 0.1 hrs. to about 100 hrs.

48. The method of claim 41, wherein the annealing comprises:  
heating the first and the second as-fabricated organic light emitting devices to the annealing temperature at a heating rate; and  
cooling the first and the second as-fabricated organic light emitting devices from the annealing temperature to a lower temperature at a cooling rate;  
wherein the heating rate and the cooling rate are each from about 0.5°C/min to about 20°C/min.

49. The method of claim 48, wherein the heating rate and the cooling rate are each from about 1°C/min to about 5°C/min.

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